



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/003,121	12/06/2001	Takanobu Takeda	KOJIM-442	5228
23599	7590	04/06/2004	EXAMINER	
MILLEN, WHITE, ZELANO & BRANIGAN, P.C. 2200 CLARENDON BLVD. SUITE 1400 ARLINGTON, VA 22201			LEE, SIN J	
			ART UNIT	PAPER NUMBER
			1752	

DATE MAILED: 04/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/003,121

Applicant(s)

TAKEDA ET AL.

Examiner

Sin J. Lee

Art Unit

1752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,2,20 and 21 is/are allowed.
- 6) ☒ Claim(s) 3-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. In view of the Amendment and Remarks/Arguments filed on January 8, 2004, previously made 103(a) rejections on claims 1, 2, and 4-7 over Chiba et al'900 in view of Yamamoto et al'318 and Watanabe et al'050 and 103(a) rejection on claim 3 over Kobayashi et al'460 in view of Chiba et al'900, Yamamoto et al'318, and Watanabe et al'050 are hereby withdrawn.
2. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 10-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 10, applicants recite, "[t]he method of claim 1, *further* comprising synthesizing the polymer (2) by . . .". By using the term "further", are applicants saying that those synthesis steps cited in claim 10 are performed separately from (i.e., in addition to) the steps cited in claim 1, or are those steps cited in claim 10 simply specific details of the method of claim 1? The Examiner assumed the latter case for the purpose of examining the claim 10 on the merit.

Appropriate correction is required (if those steps cited in claim 10 are simply specific details of the method of claim 1, applicants need to delete "further" in claim 10).

5. Claims 16-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 16, applicants recite, "[t]he method of claim 1, *further* comprising synthesizing the polymer (2) by . . .". By using the term "further", are applicants saying that those synthesis steps cited in claim 16 are performed separately from (i.e., in addition to) the steps cited in claim 1, or are those steps cited in claim 16 simply specific details of the method of claim 1? The Examiner assumed the latter case for the purpose of examining the claim 16 on the merit.

Appropriate correction is required (if those steps cited in claim 16 are simply specific details of the method of claim 1, applicants need to delete "further" in claim 16).

6. Claims 16-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 16, applicants recite, "[t]he method of claim 1, further comprising synthesizing the polymer (2) by living anion polymerization by reacting an alkoxyalkoxystyrene monomer, a (meth)acrylic tertiary ester monomer and optionally, a styrene or styrene derivative monomer, in an organic solvent." However, based on the reading of present specification (see pg.11, lines 10-28), it is clear that it is not the polymer (2) that is produced by living anion polymerization by reacting the alkoxyalkoxystyrene monomer, a (meth)acrylic tertiary ester monomer and optionally, a styrene or styrene derivative monomer. It is the polymer (1) that is produced by the living anion polymerization step, and the polymer (2) is produced only after the resulting polymer (1) is subjected to acid hydrolysis in an organic solvent for deblocking the acetal protective groups (pg.11, lines 26-28 of present specification states that for deblocking reaction in the second approach, the same technique as used in radical polymerization (i.e., the first approach as explained in pg.10, lines 23-37, pg.11, lines 1-9) may be used.

Appropriate correction is required. For the purpose of examining claim 16 on the merit, the Examiner assumed that applicants meant claim 16 to comprise synthesizing the polymer (2) by polymerizing an alkoxyalkoxystyrene monomer, a (meth)acrylic tertiary ester monomer and optionally, a styrene derivative monomer by living anion polymerization in an organic solvent and subjecting the resulting polymer (1) to acid

hydrolysis in an organic solvent for deblocking the acetal protective groups, thereby producing a polymer (2).

7. Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 11, applicants recite, "wherein *the organic solvent* is toluene, benzene, tetrahydrofuran, diethyl ether or dioxane." Since there are two occurrences of "organic solvent" in claim 10 (i.e., organic solvent used during the polymerization and organic solvent used during the acid hydrolysis), applicants need to specify which organic solvent is being referred to by "the organic solvent".

Appropriate correction is required. For the purpose of examining the claim 11 on the merit, the Examiner interpreted "the organic solvent" to be the organic solvent used during the polymerization based on the reading of present specification (pg.10, lines 33-35).

8. Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 15, applicants recite ". . . the reaction times is *usually* about 0.2-100 hours." Using the term "usually" renders the scope of the claim indefinite.

Appropriate correction is required (the Examiner would like to recommend to delete "usually" from present claim 15).

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 3-5, 7, and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Urano et al (6,656,660 B1).

In Production Example 4, Urano synthesizes poly(p-1-ethoxyethoxystyrene/p-hydroxystyrene/p-tert-butoxystyrene) (having Mw of 18,200 and M2/Mn of 1.11) by introducing 1-ethoxyethoxy group (an acid labile group) into phenolic hydroxyl groups of the poly(p-hydroxystyrene/p-tert-butoxystyrene) (having Mw of 15,500 and Mw/Mn of 1.12).

Urano's poly(p-1-ethoxyethoxystyrene/p-hydroxystyrene/p-tert-butoxystyrene) meets the present formula (2') of claim 3: in the formula (2'), r and p2 can both be zeros, R¹ and R⁴ can be H atoms,, R⁵ can be t-butoxy group (an acid labile group), n can be 1, R⁰ can be -CH(CH₃)-O-CH₂CH₃ group (an acid labile group).

The poly(p-hydroxystyrene/p-tert-butoxystyrene) meets the present formula (2) of claim 1: in the formula (2), r can be zero, p2 can be zero, R¹ and R⁴ both can be H atoms, R⁵ can be a t-butoxy group (an acid labile group), and n can be 1. Also, this polymer has the Mw of 15,500 and Mw/Mn of 1.12. Therefore, Urano's poly(p-

hydroxystyrene/p-tert-butoxystyrene) (having Mw of 15,500 and Mw/Mn of 1.12) teaches present polymer (2) having Mw of 1,000-500,000 and Mw/Mn of 1.0-1.3.

Since present claim 3 is written in *product-by-process claim language* ("the polymer comprising recurring units of formula (2) *prepared by the method of claim 1*"), and since Urano teaches present polymer of the formula (2), it does not matter that Urano's poly(p-hydroxystyrene/p-tert-butoxystyrene) having Mw of 15,500 and Mw/Mn of 1.12 is not prepared by the method of present claim 1, and thus, Urano teaches present invention of claim 3. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See also MPEP 2113.

With respect to present claim 8, in his Example 7 (see Table 3), Urano uses the poly(p-1-ethoxyethoxystyrene/p-hydroxystyrene/p-tert-butoxystyrene), which is made in his Production Example 4 and which teaches present polymer (2'), in a positive type chemically amplified resist composition together with two photoacid generators and two solvents. Therefore, Urano teaches present invention of claim 8.

With respect to present claims 4 and 5, the poly(p-1-ethoxyethoxystyrene/p-hydroxystyrene/p-tert-butoxystyrene) having Mw of 18,200 and M2/Mn of 1.11, which is made in his Production Example 4 and which teaches present polymer (2'), also

teaches present polymer of formula (2): in the present formula (2), r can be zero, R^1 and R^4 can be H atoms, R^5 can be t-butoxy group (an acid labile group), n can be 1, R^2 can be $-\text{CH}_3$ group (an alkyl group of 1 carbon atom), and R^3 can be an $-\text{CH}_2\text{CH}_3$ group (an alkyl group of 2 carbon atoms). Since present claims 4 and 5 are written in *product-by-process claim language* ("the polymer comprising recurring units of formula (2) *obtained by the method of claim 1*"), and since Urano's poly(p-1-ethoxyethoxystyrene/p-hydroxystyrene/p-tert-butoxystyrene) having *Mw of 18,200 and M2/Mn of 1.11* teaches present polymer of formula (2), it does not matter that Urano's polymer is not made by the method of present claim 1. See In re Thorpe, supra. Therefore, Urano's Example 7, which uses the poly(p-1-ethoxyethoxystyrene/p-hydroxystyrene/p-tert-butoxystyrene) having *Mw of 18,200 and M2/Mn of 1.11* in a positive type chemically amplified resist composition together with two photoacid generators and two solvents, teaches present inventions of claims 4 and 5.

With respect to present claim 7, Urano teaches (col.33, lines 21-25) that his resist composition may additionally incorporate basic compounds. Therefore, Urano teaches present invention of claim 7.

Claim Rejections - 35 USC § 103

11. Claims 6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Urano et al (6,656,660 B1) as applied to claims 1 and 3 above respectively, and further in view of Houlihan et al (5,843,624).

Urano et al with respect to claims 1 and 3 are discussed above in Paragraph 10. Although Urano does not disclose the use of presently claimed dissolution inhibitor in

his composition, it is well known in the art, evidenced by Houlihan, col.11, lines 38-47, to use a dissolution inhibitor together with a polymer having acid-labile groups and a photoacid generator *in order to enhance the contrast* between the exposed portion of the resist material and the unexposed portion (the contrast between the exposed portion and the unexposed portion is enhanced because the aqueous base solubility of *both* the polymer and the dissolution inhibitor is altered by the acid generated by the photoacid generator when the resist material is exposed to radiation and subjected to a post-exposure bake). Therefore, it would have been obvious to add a dissolution inhibitor to Urano's photoresist composition in the Example 7 *in order to enhance the contrast* between the exposed portion of the resist material and the unexposed portion as taught by Houlihan. Therefore, Urano in view of Houlihan would render obvious present inventions of claims 6 and 9.

Allowable Subject Matter

12. Claims 1, 2, 20, and 21 are allowed. Urano et al does not teach or fairly suggest the present method of preparing the polymer of the formula (2) which comprises the step of effecting deblocking reaction on the polymer of the formula (1) in the presence of an acid catalyst as claimed in present claim 1.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F. Huff, can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S. J. Lee
S. Lee
March 29, 2004

Mark F. Huff
MARK F. HUFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

Sin J. Lee
Sin J. Lee
Patent Examiner
Technology Center 1700